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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/597,904	08/11/2006	Wayne M. Moreau	FIS920030012US1	7740
33074 7590 01/25/2010 INTERNATIONAL BUSINESS MACHINES CORPORATION DEPT. 18G BLDG. 321-482 2070 ROUTE 52 HOPEWELL JUNCTION, NY 12533				
EXAMINER				
LEE, SIN J				
ART UNIT		PAPER NUMBER		
1795				
NOTIFICATION DATE		DELIVERY MODE		
01/25/2010		ELECTRONIC		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

EFIPLAW@US.IBM.COM

Office Action Summary

Application No.

10/597,904

Applicant(s)

MOREAU ET AL.

Examiner

Sin J. Lee

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 November 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 8 and 10-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 8 and 10-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

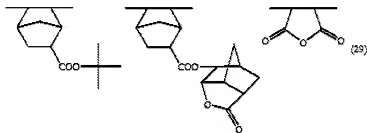
Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/GS-08)
Paper No(s)/Mail Date 11/12/2009
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

Claim Rejections - 35 USC § 103

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
2. Claims 8, 10, 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujimori (US 2003/0186161 A1) in view of in view of Koguchi et al (4,814,244).

In Example 129, Fujimori teaches (see TABLE 106, [0375], [0390] and TABLE 2) a positive photoresist composition containing Resin (29) shown below, an acid generator, a solvent, and basic compounds, C2 (tetradecylamine) and 4 (triphenylimidazole which is present room temperature solid base):



Fujimori's basic compound C2 used in his Example 129 represents his basic compound (C-2), which has at least one substituted or unsubstituted aliphatic hydrocarbon group having not less than 8 carbon atoms (see [0252] and [0256]-[0257]). Fujimori teaches that his compound (C-2) can be used in combination with other conventionally known basic compounds (see [0258]). Among the more preferred examples (there are only 13 examples listed) of such conventionally known basic compounds, Fujimori includes an imidazole (such as triphenylimidazole used in his Example 129) as well as 1-naphthylamine (see [0262]). Since Fujimori teaches that his basic compound (C-2) can be used

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together with other basic compounds in combination (see [0263]), it would have been obvious to one skilled in the art to use tetradecylamine, triphenylimidazole (present room temperature solid base) and 1-naphtylamine (present liquid low vapor pressure base) together in combination in his Example 129 with a reasonable expectation of success.

Fujimori applies his positive photoresist composition onto a substrate. The resulting photoresist layer is exposed to light (such as KrF excimer laser beam, ArF excimer laser beam, or *electron beam*) through a desired mask, followed by baking and development to obtain a *resist pattern*. (see [0306]-[0307]). Fujimori also uses a reflection preventing film between the substrate and the photoresist layer (see [0356]). Fujimori's composition provides a resist pattern, in which edge roughness is improved and development defect is restrained (see [0009]).

Fujimori does not explicitly teach present etching step after the development or present material layer comprising a chromium-containing composition. As evidenced by Koguchi (col.1, lines 11-20), a resist pattern (such as Fujimori's resist pattern) is *widely used* in the field of semiconductor device, for example, in producing a mask for manufacturing the semiconductor device. As generally stated in Koguchi, such mask is manufactured by (i) depositing a metal layer such as a chromium layer on a surface of a glass substrate, (ii) coating a resist film on the metal layer, (iii) imagewise exposing the resist film by an electron beam, (iv) developing the resist film to form the resist pattern, and (v) selectively etching the metal layer by using the resist pattern as an etching mask.

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Since Fujimori state that his positive photoresist composition is also used in the production process of semiconductor devices, and since Fujimori's composition is also usable with electron beam, it would have been obvious to one skilled in the art to use Fujimori's photoresist composition in the method of producing a mask for manufacturing the semiconductor device as illustrated by Koguchi with a reasonable expectation of obtaining a resist pattern having improved edge roughness and restrained development defect. Thus, Fujimori in view of Koguchi render obvious present inventions of claims 8, 12 and 13.

With respect to present claim 10, Fujimori's Resin (29) shown above contains an acid-decomposable group of t-butyl group. Fujimori also teaches other groups that can be used equally for his resin, such as tetrahydropyranyl group or a tetrahydrofuryl group (see [0143]-[0144]). Thus, it would have been obvious to one skilled in the art to replace the acid-decomposable group in Resin (29) with a tetrahydropyranyl group or a tetrahydrofuryl group with a reasonable expectation of success. Thus, Fujimori in view of Koguchi renders obvious present invention of claim 10.

3. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fujimori (US 2003/0186161 A1) in view of Koguchi et al (4,814,244) as applied to claim 8 above, and further in view of Okumura et al (4,954,218).

Fujimori in view of Koguchi is discussed above. Even though Fujimori in view of Koguchi does not explicitly mention reactive ion etching for its etching step, it is conventionally known in the art, as evidenced by Okumura, col.1, lines 10-13, that for etching step in the art of semiconductor device, a reactive ion

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etching is utilized. Thus, it would have been obvious to one skilled in the art to use a conventionally known etching technique such as reactive ion etching for the etching step in Fujimori in view of Koguchi. Thus, Fujimori in view of Koguchi and further in view of Okumura renders obvious present invention of claim 11.

4. Claims 8, 10, 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al (US 2002/0090569 A1) in view of in view of Koguchi et al (4,814,244).

In Example 14, Suzuki teaches (see TABLE 1, [0926], [0929], [0914]) a positive photoresist composition containing an acid generator, Resin B-7 (poly(p-hydroxystyrene) in which some of H atoms of phenolic hydroxyl groups have been replaced by *1-ethoxyethyl groups*), Resin b-2, a solvent and acid diffusion controllers, which are D-3 (benzimidazole which is present room temperature solid base) and D-6 (triethanolamine which is present liquid low vapor pressure base).

Suzuki applies his positive photoresist composition onto a substrate. The resulting photoresist layer is exposed to light (such as KrF excimer laser beam or *electron beam*) through a desired mask, followed by baking and development to obtain a *resist pattern*. (see [0883] and [0875]). Suzuki also teaches that the substrate can be covered with an inorganic nitride film or an organic antireflection film (see [0874]).

Suzuki does not explicitly teach present etching step after the development or present material layer comprising a chromium-containing composition. As evidenced by Koguchi (col.1, lines 11-20), a resist pattern (such

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as Fujimori's resist pattern) is *widely used* in the field of semiconductor device, for example, in producing a mask for manufacturing the semiconductor device. As generally stated in Koguchi, such mask is manufactured by (i) depositing a metal layer such as a chromium layer on a surface of a glass substrate, (ii) coating a resist film on the metal layer, (iii) imagewise exposing the resist film by an electron beam, (iv) developing the resist film to form the resist pattern, and (v) selectively etching the metal layer by using the resist pattern as an etching mask. Since Suzuki state that his positive photoresist composition is also used in the production process of semiconductor devices (see [0937], and since Suzuki's composition is also usable with electron beam (see [0875]), it would have been obvious to one skilled in the art to use Suzuki's photoresist composition in the method of producing a mask for manufacturing the semiconductor device as illustrated by Koguchi with a reasonable expectation of success. Thus, Suzuki in view of Koguchi render obvious present inventions of claims 8, 10, 12 and 13.

5. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al (US 2002/0090569 A1) in view of Koguchi et al (4,814,244) as applied to claim 8 above, and further in view of Okumura et al (4,954,218).

Suzuki in view of Koguchi is discussed above. Even though Suzuki in view of Koguchi does not explicitly mention reactive ion etching for its etching step, it is conventionally known in the art, as evidenced by Okumura, col.1, lines 10-13, that for etching step in the art of semiconductor device, a reactive ion etching is utilized. Thus, it would have been obvious to one skilled in the art to use a conventionally known etching technique such as reactive ion etching for

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the etching step in Suzuki in view of Koguchi with a reasonable expectation of success. Thus, Suzuki in view of Koguchi and further in view of Okumura renders obvious present invention of claim 11.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sin J. Lee whose telephone number is 571-272-1333. The examiner can normally be reached on Monday-Friday from 9:00 am EST to 5:30 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia Kelly, can be reached on 571-272-1526. The fax phone number for the organization where this application or proceeding is assigned is **571-273-8300**.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Sin J. Lee/
Primary Examiner, Art Unit 1795
January 16, 2010

